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SHORT COMMUNICATION

AUSTRALIAN ABORIGINAL BURNING, MISHAPS AND CONFLICT: IMPLICATIONS FOR ETHNOBIOLOGY

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INTRODUCTION

Aboriginal burning and its long-term effects on Australian vegetation and ecosystems have been hotly debated. Jones (1969) characterizes Aborigines as 'fire-stick farmers' who deliberately manipulated fire regimes and resources bringing about significant changes to the Australian biota. Horton (1982), on the other hand, suggests that climate and soil are determinants of vegetation with human ignition being relatively insignificant.[1] Today, ecologists and land managers are grappling with the decline of many fire-sensitive species, such as the cypress pine *Callitris intratropica,* which has been severely impacted by altered fire regimes following the settlement of the northern Australian savanna (Bowman 1995a, 1995b; Bowman *et al.* 1988, 1993; Haynes 1985, 1991). Land use has changed, and feral animals and plants now add further ecological complexity (Bowman 1991; Latz 1995a). Across much of northern and central Australia there remains considerable scope for collaborative research involving Aborigines, anthropologists and ecologists with respect to the ecology of Aboriginal burning.

Aboriginal society has also been significantly transformed. Alienation from the land and economic impoverishment have occurred in many regions, while some groups continue to occupy traditional lands and now engage in new forms of economic endeavor such as ecotourism or beef cattle production. Aboriginal burning continues, albeit with many contemporary adaptations, and this practice attracts the scrutiny of policy analysts (Hughes 1995) and scientists (Braithwaite 1995; Press 1995) who, despite differing land management priorities, recognize the practical significance of understanding Aboriginal fire use. Anthropologists and ethnobiologists should contribute to this discussion, although with the exception of Lewis (1982, 1985, 1989, 1991, 1992, 1994) and more recently Bradley (1995), few substantial accounts have been offered. Lewis (1982), in particular, has firmly set Australian Aboriginal burning in the broad context of hunter-gatherer studies with his discussion of deliberate environmental manipulation and resource domestication.

In this paper, I sketch the pragmatic and esoteric aspects of Aboriginal burning, drawing together the fragments of existing anthropological research within an ethnobiological and ecological framework. But my concerns are also with broader issues of relevance to ethnobiology and themes in human-environment

relationships. Fire, even when used by experienced practitioners, whether rangers, pastoralists or Aborigines, is a volatile and easily mis-managed tool.[2] Sources of conflict and resolution processes have been a major analytical focus for anthropologists (Gluckman 1965; Hallpike 1977; Hiatt 1965; Meyers 1986). While conflict in Aboriginal communities is mostly generated by causes other than fire, I argue that social tension arising from fire-related problems is not uncommon and offers an opportunity for a profitable marriage of political anthropology and ethnobiology (see Healey 1994 for a similar orientation). To set the stage for this theoretical convergence, I begin with an outline of fire in Aboriginal practice and thought.

ABORIGINAL FIRE USE, KNOWLEDGE AND CHANGE

Aboriginal cosmology and natural history concepts are well documented (e.g. Rose 1992). Narrative traditions record the eventful journeys of creative ancestors who sculpted landforms and introduced all natural phenomena, including people. Rules for the ritual maintenance of country, including the proper use of fire, were established to ensure that the social and natural order would prevail. Of course, the use of fire has numerous practical applications as well. Campsites are cleared of grass and snakes, signals transmitted between distant parties and game driven to strategic places for harvesting. However, even in hunting, burning is not hap-hazard and the supernatural dimension is ever-present. Chaloupka and Giuliani (1984) detail strategies for various hunting scenarios used by the Mayali people of the Kakadu region. These maneuvers take account of the prey, season, time of day, topography, wind dynamics, and the number of available hunters. Wallaroo[3] hunting at night is described as particularly hazardous, with malevolent spirits attempting to deceive the hunters.

Systems of classification are also keys to understanding Aboriginal fire knowledge. Beyond biological taxonomies which recognize discontinuities in nature and assemble named and covert clusters of folk taxa (Hunn 1977; Waddy 1988), social classification schemes integrate the natural world into the social and cosmic order. While humans have individual membership in a social class, such as a semi-moiety, each species is systematically assigned to the same categories in ways which may have implications for the ethnography of burning. For example, Chaloupka and Giuliani (1984) have shown that the allocation by the Mayali people, of certain grasses (Poaceae) to the semi-moiety associated with fire, is dependent on the species' flammability. Those species which readily and fiercely combust are included in the same semi-moiety as fire, while less flammable grasses are assigned to another social category.

Totemic classification and fire ecology are also linked. Totemism and species selection have been of enduring concern to anthropologists (Bulmer 1978, 1979; Elkin 1933; Levi-Strauss 1966), and Waddy (1988) demonstrates that the distribution and sharing of totems among Groote Eylandt clans is not random. Waddy finds that totemic classification is based on associations in nature as well as myth, not hierarchical conceptual thought as with biological taxonomies. Sentimental attachment to locality is also important in totemic beliefs, and Peterson (1972) has shown that totemism has an adaptive significance in the spatial arrangement of groups and territories. As emblematic indicators of the relationships between hu-

mans, natural entities and places, totems are integral to Aboriginal burning. Strategies for elicitation must be carefully considered to access environmental knowledge encoded in social phenomena.

In Waddy's (1988) account of totemic classification, the cypress pine *Callitris intratropica* and other related totems are shared by a number of clans, influencing the distribution of clan territories and sites. This tree is fire-sensitive and requires careful management (Bowman 1995a, 1995b; Bowman *et al.* 1988, 1993; Haynes 1985, 1991), and Bowman (1995b) suggests that the survival and characteristics of stands in some environments can only be attributed to skilled burning by Aboriginal people. On Maria Island in the Limmen Bight of the Gulf of Carpentaria, a particular cypress pine is regarded as potentially harmful if disturbed, and knowledge of the poisonous nature of the tree and fear of sickness are widespread (Bradley 1988; McLaughlin 1978/79). The sap, which is used in sorcery, can only be collected by persons in a prescribed custodial role. In the mythology of the local Mara people, the Plains Kangaroo deliberately left this cypress on the island rather than the mainland to reduce the likelihood of damage to the tree and the risk of social harm (Bradley 1988). It is probable that local fire regimes have evolved to minimize impact on the cypress habitat. Similar examples of fire protection at totemic places are given by Haynes (1985), Jones (1980) and Lewis (1985, 1989, 1992). Careful planning to reduce scorch height and to protect tree-dwelling fauna may have a similar motivation.

Exclusion of fire from places of importance is not always desirable. Bradley (1984, 1995) describes burning to cleanse country of the spirit of the recently deceased. This common purifying ritual is necessary before general use of the area can be resumed. Some potentially harmful totemic sites can be calmed with fire and smoke. One place discussed by Haynes (1991) can only be approached by people with appropriate affiliations who must sing particular songs and carefully ignite the grass on the designated access route. Such activity must only be undertaken when wind conditions are favorable for directing the smoke. Obviously, great care is needed with fire as well as substantial environmental knowledge.

While I have so far furnished an account of burning in its traditional context, the picture is far from complete. The movement of people across the landscape is now influenced by land title and legislation (Hughes 1995), access restrictions, residence, vehicles, roads and fencelines. Matches are now the norm for ignition. Waddy (1988) describes burning as a random activity carried out as roads become passable after the monsoonal wet season. Head and Fullagar (1991) provide a more detailed description of vehicle-based burning in a region where extensive pastoral activities dominate land use. Two points are significant here. First, the use of new technology does not necessarily mean a discontinuity in cultural knowledge with regard to fire. Lewis (1992) is correct in chiding anthropologists for equating technology with material culture and failing to consider underlying ecological knowledge. The second point I wish to make is that ethnobiological studies, including resource management and fire use, must account for specific regional environmental and socio-cultural histories, and the role of the state in land use planning and policy. While traditions continue, Aboriginal communities are undergoing major shifts in social organization, knowledge transfer between generations and the application of land management practices in everyday life.

The following discussion looks at fire related mishaps, conflict and the prospects for ethnography.

FIRE, CONFLICT AND ETHNOGRAPHIC RESEARCH

Violation of significant sites through inappropriate fire management will undoubtedly have social consequences, and ritual responsibility and rights of access will emerge as dominant issues. Gould (1971) has documented one such incident in which a fire desecrated a sacred site associated with particular totemic macropods. Although the ignition source was unclear and damage may not have been intended, the post-fire discussions escalated into intense anger. Insufficient information about the culprits and other pressing social needs eventually quelled the situation. However, Gould highlights the potential for an inflammation of grievances at a later time. Patrick McConvell (pers. comm.) has also witnessed a similar incident in the Kimberley region in which a cache of sacred objects was destroyed. The storage of sacred objects in carefully selected rocks and trees, requires that fires in the vicinity be controlled. In this instance a fire destroyed the objects placed in a tree, and amidst the social tension and drama which ensued, death was considered to be an appropriate penalty for the arsonists. As these were discovered to be Europeans the matter was not pursued. Bradley (1995:30) is similarly illustrative of the emotion and potential hostility which accompanies inappropriate fires. In regard to burning without permission he writes: "Postures of feigned or real anger still occur, people still issue challenges using digging sticks and crowbars as weapons...." The seriousness of these events is also emphasized in Warner's (1958) note that damage to log coffin burials from deliberate burning of country may be sufficient cause for retaliatory homicide. Social tension from indiscriminate burning is evidently not uncommon.

These incidents raise some pertinent points regarding anthropology and the ethnographic orientation of ethnobiology. It is now beyond contention that hunter-gatherers actively manage the landscape, but it must not be assumed that fire plans are implemented without mishap. Although anthropologists have moved beyond simplistic Rousseauian views of human-environment relationships (Friedman 1979), we must be cautious of regarding indigenous people as "paragons of ecological wisdom" (Brunton 1992:1) unable to err in fire management. Lewis (1992, 1994) has commented on occasional mistakes by Aborigines, and in many other societies with a highly developed fire technology, such as the Papuan Tauade, loss of fire control can destroy "trees, gardens, villages and people" and generate neighborhood clashes (Hallpike 1977:204). Even in the hands of experts a failure of judgment in fire management can have enormous environmental and social consequences. Poorly skilled adults, malicious individuals and playful and careless children also abound in all cultures. Political anthropologists have long held an interest in the study of conflict situations (e.g. Gluckman 1965; Hiatt 1965; Meyers 1986) and this orientation is of immense relevance to problems in human ecology and ethnobiology. Situations of fire related tension may therefore be ethnographically rewarding, by bringing into sharper focus Aboriginal perceptions of ecological entities and processes, and the decision making organization which underpins resource management.

Poiner (1985, 1990) has demonstrated the merits of a similar ethnographic strategy in her study of the response to bushfires by the community of the New South Wales rural town of Marulan. While not concerned with ecology, Poiner's research certainly portrays the dynamics of the human environment in which land management is embedded. In the social drama which unfolded, both during and after a major fire event, social relations were strained and new alliances forged. Traditional gender roles were temporarily suspended in some contexts, while the overall secondary position of women was underlined. The usual norms of group membership became more flexible. In general, the heightened tension and sense of community, made clear many social relationships and long-term ties to land and lifestyle which otherwise would have remained obscure. Attachment to kin and country, and the necessity for mechanisms to resolve conflict, are universal themes of human existence. Cross-cultural comparison in the fire prone Australian environment reinforces the need to adopt a broader approach to ethnobiology and fire research.

With regard to Aboriginal burning, analysis of conflict resulting from unplanned or mis-managed conflagrations may reveal new aspects of fire ecology and cosmology, and should throw light on the associated social organization, which has received only limited attention.[4] Furthermore, what has been reported concerning the social organization of burning is frequently contradictory. Bradley (1984, 1995) has indicated that the Yanyuwa people of the Gulf of Carpentaria organize burning along the lines of complementary social groups. Managers of country—matrifiliates—usually burn or request ignition by paternally affiliated kin, whose land ownership represents one side of the dual system in which reciprocity reverses roles on allied estates. Fires of unknown origin are investigated, and if rights are exceeded the perpetrators are strongly challenged. Lewis (1989), in his Kakadu material, points out that despite responsibility to senior clan members, men, women and children may start fires while in flammable country subject to their knowledge of appropriate habitat burning requirements. Yet, in an end note to Lewis' paper, a personal communication from Meehan and Williams is cited which states that: "most 'traditional burning' in Arnhem Land ... [is] carried out by women" (1989:958). Gould (1971) shows that in the central Australian societies the use of fire has no gender or age restrictions, and that fires set for a number of purposes are allowed to burn uncontrolled. Lewis (1992) describes restrictions on intense fires in rainforest patches for ritual and totemic reasons, but gives an account of casually conducted 'corrective' burning to clear neglected country in which fuel loads are extremely high. Resulting fires of great intensity are noted as severely affecting rainforest communities, although Lewis does not discuss any negative ecological or social outcomes. Obviously if totemic sites or significant habitats and species are to be properly managed, the authorization and deployment of people to light fires must be coordinated at some level. Custodial rights and the acquisition of specialist knowledge relating to the pragmatic and esoteric dimensions of land-care are the crucial factors. Conflict may be the context in which ethnographic insights are gained.

High-intensity corrective burning is the subject of a more thorough discussion by Lewis (1994) in which he reveals the Aboriginal logic which integrates this practice with other traditional fire management activities. Regular burning is an

action necessitated by moral responsibilities to kin and country, so that restorative fires, even under conditions considered inappropriate by non-Aboriginal fire authorities, may be set to rectify any previous neglect and excess of combustible material. Corrective fires may even be lit with "an almost manic compulsion" for further delays would be highly remiss (Lewis 1991:270). One example given by Lewis, based on information supplied by a biologist who was present, describes the burning of Maria Island to fulfill obligations to a recently deceased kinsman after a long absence from the island and at least fifteen fire-free years. The result was a conflagration which reduced almost the whole island to "4,000 hectares of burnt snags and ash" (Lewis 1994:951) and caused considerable satisfaction for the traditional owners. This is the same island that I have already discussed in the context of a culturally significant and potentially dangerous cypress pine, a species with limited fire tolerance. Consequences for the cypress pine or Maria land owners are unknown.

In the context of social change the potential for mishaps has increased, and this creates new dilemmas for the application of Aboriginal burning in land management programs. Features of the landscape remain a focal point for Aboriginal people in the construction of their ethnic identity. But as I have indicated earlier, traditional patterns of Aboriginal land use have been disrupted and transformed along with the mechanisms for the intergenerational transmission of knowledge and skills. Peter Latz (1995a:81), a botanist with substantial experience in fire research and Aboriginal communities, makes some valid points in regard to Aboriginal burning:

> But it's only years and years of experience that make it look easy...The only trouble is...once your burning system has been stopped it is one hell of a job getting it back again!...This last [fire in the South Australian Mann Ranges] was lit by Aborigines but they didn't realize the problems that occur when the fuel had built up. They had been away from their country in the past and the system had broken down...A whole lot of figs, which are sacred in this country, were burnt out of existence and the rock wallaby[5] which is practically extinct on this range, has lost some of its tucker.

Like Latz (1995a; 1995b), I strongly suggest that there is much to be learned from Aboriginal people which can be of benefit to fire ecologists, anthropologists and government and private land managers. Researchers, however, should be mindful that intentional Aboriginal burning is not always the best practice for sound environmental stewardship, and an understanding of fire behavior and the potential for mistakes and unintended outcomes is essential (cf., Johannes and Lewis 1993).

CONCLUDING REMARKS: IMPLICATIONS FOR ETHNOBIOLOGY

Evidently more research and new strategies are required to investigate fire ecology and Aboriginal burning. Interdisciplinary dialogue is also essential to informed anthropological discourse. Systems of ethnobiological classification incorporate important species level information but are not an adequate represen-

tation of Aboriginal fire use and knowledge. I have commented on the volatile nature of fire and the potential for disputes and social tension due to mis-management. Loss of fire control appears more frequent than is acknowledged and problems are inevitable given the nature of children and the inherent disparities in human intentions and competence. Social upheaval may be a key to revealing Aboriginal perspectives on environmental phenomena and ecological processes as well as the socio-political context of burning. For ethnobiology in general, there is clearly a case for a broadening of theoretical dimensions as a means of understanding the application of ethnobiological knowledge in practical resource management. The analysis of conflict will open up new ethnographic ground and may bridge the divide between the ethnoscience school and other branches of anthropological inquiry.

NOTES

[1] This issue is far from resolved. The literature on prehistory and paleoecology is vast and a discussion beyond the seminal viewpoint of Jones and Horton's influential response is not warranted here. Stephen Pyne (1991) has produced a well-crafted and comprehensive synthesis of existing material from a range of disciplines and makes some interesting comments on the evolving interdependence of flora, fire and humans. Flannery (1995) provides another important account including an argument for the role of Aboriginal burning in consuming accumulated fuel and increasing fire frequency following the extinction of the herbivorous megafauna (cf., Bowman 1991). But despite the widespread influence of Jones' thesis most researchers would agree that evidence is sparse, and the issue will remain contentious until much more research is done (Bowman and Brown 1986; Bowman 1995b; Latz 1995b).

[2] My background, prior to anthropology, was in agriculture, forestry and park management. I have witnessed, and been involved in, many incidents in which experienced personnel have made incorrect judgments and lit fires which have reacted rapidly to unforeseen conditions.

[3] A kangaroo relative and a member of the family Macropodidae.

[4] In 1992 Professor Henry Lewis wrote: "... consideration of the social dimensions involved in such activities have all but been ignored." (p. 23). This situation has not substantially changed since.

[5] See note 3, above.

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